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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/937,780 | 09/28/2001 | Shahram Mihan | 0050/49854 | 7113 |

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WASHINGTON, DC 20036

EXAMINER

LEE, RIP A

ART UNIT PAPER NUMBER

1713

DATE MAILED: 10/17/2003

A

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/937,780

Applicant(s)

MIHAN ET AL.

Examiner

Rip A. Lee

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on September 8, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 and 12 is/are allowed.
- 6) ☒ Claim(s) 1-7, 9 and 10 is/are rejected.
- 7) ☒ Claim(s) 8 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 8, 2003 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-5, 7, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-231317 to Tani *et al.* in view of U.S. Patent No. 5,576,263 to Badley *et al.*

The prior art of Tani *et al.* discloses a process of olefin polymerization in the presence of a catalyst system comprising a chromium compound containing a substituted triazacyclohexane ligand and an activator (Formula I, paragraphs [0003], [0009], [0053]-[0055]). Use of chromium precursors is described in detail in paragraphs [0014]-[0016]. Borane or borate activators are listed extensively in paragraphs [0042]-[0043]. The invention encompasses polymerization of ethylene, propylene, butanes, as typical alpha olefins (paragraph [0045]). The reference does not provide an example of copolymerization of olefins as claimed. Copolymerization using chromium based catalysts is not novel as shown in U.S. Patent No. 5,576,263 to Badley *et al.*

Claim 1 of the reference is drawn to copolymerization of ethylene and a comonomer, and said comonomers include C₃-C₁₀ alpha olefins (col. 5, lines 4-7). Thus, the notion of copolymerization is well within the grasp of one skilled in the art, and it would have been obvious to arrive at use of the catalyst system Tani *et al.* for copolymerization of ethylene and alpha olefins (*i.e.*, present claims 1 and 2). One would have made the association readily because both prior art relate to chromium-based catalysts for producing polyolefins.

It would have been obvious to arrive at the compound and activator described in present claims 3-5 and 7 since these features are fully disclosed in the Tani *et al.* patent (*supra*). The use of a supported catalyst system is not disclosed in Tani *et al.* Use of a support is well-established in the field of chromium based olefin polymerization catalysts, as shown in Badley *et al.*, and the notion of using a support (as described in present claims 9 and 10) would have been obvious to one with skill in the art.

5. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koehn *et al.* (*Abstr. ACS*, 1997) in view of U.S. Patent No. 5,576,263 to Badley *et al.*

Koehn *et al.* discloses the polymerization of ethylene in the presence of a catalyst comprising of *N*-substituted 1,3,5-triazacyclohexanes (R_3TAC) and methylalumoxane (MAO) coactivator. Specifically, the organometallic compound is $(R_3TAC)CrCl_3$. The reference does not provide an example of copolymerization of olefins as claimed. Copolymerization using chromium based catalysts is not novel as shown in U.S. Patent No. 5,576,263 to Badley *et al.* Claim 1 of the reference is drawn to copolymerization of ethylene and a comonomer, and said comonomers include C_3 - C_{10} alpha olefins (col. 5, lines 4-7). Thus, the notion of copolymerization is well within the grasp of one skilled in the art, and it would have been obvious to arrive at use of the catalyst system Koehn *et al.* for copolymerization of ethylene and alpha olefins (*i.e.*, present claims 1 and 2). One would have made the association readily because both prior art relate to chromium-based catalysts for producing polyolefins. Use of components described in claims 3-6 would be obvious because they are fully disclosed in Koehn *et al.*

Allowable Subject Matter

6. Claims 8 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 8 and 12 would be allowed over the cited prior art because none teaches use of a triazacyclohexane ligand in which at least one of R^1 , R^2 , and R^3 is different from the other radicals of this group. Also, none of the cited references teaches metal complexes containing bridged triazacyclohexane ligands.

7. Claims 11 and 12 are allowed over the cited prior art because none teaches use of a triazacyclohexane ligand in which at least one of R^1 , R^2 , and R^3 is different from the other radicals of this group. Also, none of the cited references teaches metal complexes containing bridged triazacyclohexane ligands.

Response to Arguments

8. Applicants traverse the rejection of claims 1-5, 7, 9, and 10 under 35 U.S.C. 103(a) as being unpatentable Tani *et al.* in view of Badley *et al.* Applicant's arguments have been considered fully, but they are not persuasive.

Applicants insist that the notion of copolymerization of olefins using chromium-based catalysts is not obvious over the cited references because such a feat is not straightforward. In support of this claim, Applicants furnish an article by Theopold *et al.* (not used in rejection, and therefore, not a “negative teaching”) showing that a chromium catalyst bearing the constrained geometry structural motif fails to incorporate α -olefins. First, it is noted that the bonding in the catalyst is quite disparate from those of the present claims. A direct comparison of chemical behavior is tenuous at best. The skilled artisan need merely follow Theopold's work and discover that pentadiimine-containing chromium catalysts are quite capable of supporting a copolymerization reaction (see attached article).

Applicants also submit that copolymerizations performed in the presence of single site catalysts results in a significant drop in polymer molecular weight compared with homopolymerization in the presence of the same catalyst. Thus, the prior art would lead one to expect that incorporation of comonomer would lead to a decrease in the molecular weight of the overall polymer. It is not clear how one arrives at these conclusions, as this principle does not apply to all single site catalysts.

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Finally, Applicants assert that impermissible hindsight was used in the rejection of claim 9. This is not the case, since use of supports is well established in the catalyst art. Such a notion is described in Badley *et al.* One would not expect Applicant's claims of ligand displacement based solely on Pearson's hard soft acid base principle. Those skilled in the art appreciate the use of thermal (calcinations) and chemical modification of silica to obviate such concerns. Furthermore, supporting of metallocenes may take place *via* an adsorptive mechanism rather than one in which the metallocene actually reacts with the silica surface.

In view of the discussion above, the rejections of record have not been withdrawn.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (703)306-0094. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (703)308-2450. The fax phone number for the organization where this application or proceeding is assigned is (703)746-7064. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

ral

October 1, 2003



DAVID W. WU
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